s18quiz: EXP LOG (Solution v130)
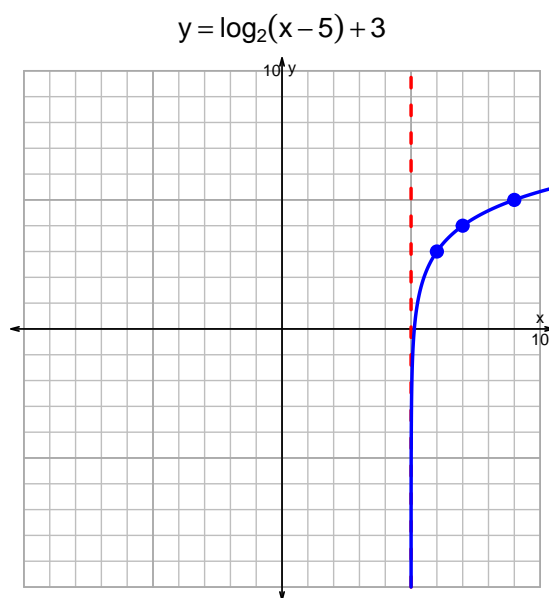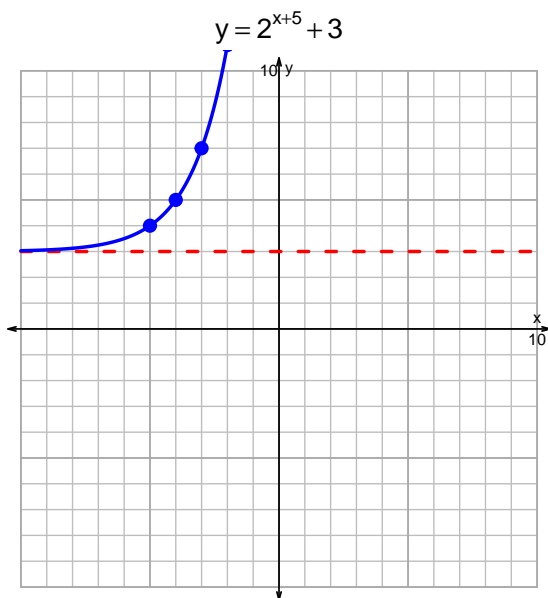
1. Graph $y = 2^{x+5} + 3$ and $y = \log_2(x-5) + 3$ on the grids below. Also, draw any asymptotes with dotted lines.

$y = 2^{x+5} + 3$

$y = \log_2(x-5) + 3$

2. Write (but do not evaluate) the solution to the equation below by writing a logarithmic expression.

$$-23 = \left(\frac{-4}{5}\right) \cdot 2^{-3t/7}$$

Divide both sides by $\frac{-4}{5}$.

$$\frac{23 \cdot 5}{4} = 2^{-3t/7}$$

Take log, base 2, of both sides.

$$\log_2\left(\frac{23 \cdot 5}{4}\right) = \frac{-3t}{7}$$
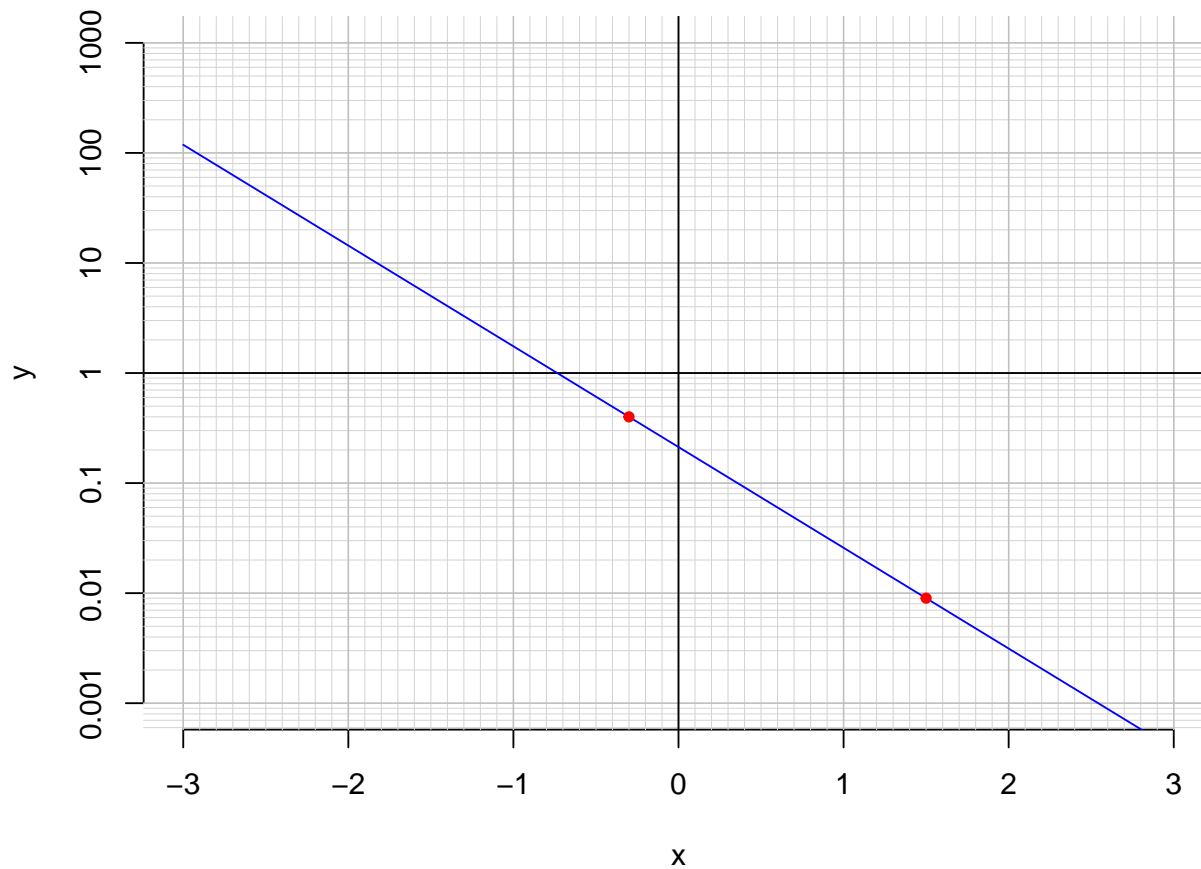
Divide both sides by $\frac{-3}{7}$.

$$\frac{-7}{3} \cdot \log_2\left(\frac{23 \cdot 5}{4}\right) = t$$

Switch sides.

$$t = \frac{-7}{3} \cdot \log_2\left(\frac{23 \cdot 5}{4}\right)$$

3. An exponential function $f(x) = 0.213 \cdot e^{-2.11x}$ is graphed below on a semi-log plot.

a. Using the plot above, evaluate $f(1.5)$.

$$f(1.5) = 0.009$$

b. Express $f^{-1}(x)$, the inverse of f.

$$f^{-1}(x) = \frac{-1}{2.11} \cdot \ln\left(\frac{x}{0.213}\right)$$

c. Using the plot above, evaluate $f^{-1}(0.4)$.

$$f^{-1}(0.4) = -0.3$$